National Institute of Environmental Health Sciences

Risk assessment, statistical source identification and seasonal fluctuation of dissolved metals in the Subarnarekha River, India

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Abstract:

Surface water samples were collected from 21 sampling sites throughout the Subarnarekha River during pre monsoon, monsoon and post monsoon seasons. The concentrations of metals were determined using inductively coupled plasma-mass spectrometry (ICP-MS) for the seasonal fluctuation, source apportionment and risk assessment. The results demonstrated that concentrations of the metals showed significant seasonality and most variables exhibited higher levels in the pre monsoon season. Principal component analysis (PCA) outcome of four factors together explained 76.9% of the variance with >1 initial eigenvalue indicated both innate and anthropogenic activities are contributing factors as source of metal profusion in Subarnarekha River. Risk of metals on human health was then evaluated using hazard quotients (HQ) by ingestion and dermal pathways for adult and child and it was indicated that As with HQingestion>1, was the most important pollutant leading to non-carcinogenic concerns. The largest contributors to chronic risks were As, V and Co, in all the seasons. The HQdermal of all the elements for adult and child were below unity, suggesting that the metals posed little hazards via dermal absorption indicating that the oral intake was the primary exposure pathway.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Food/Water Quality, Precipitation

Food/Water Quality: Other Water Quality Issue

Water Quality (other): heavy metals

Geographic Feature:

resource focuses on specific type of geography

Freshwater

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: India

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Other Health Impact

Other Health Impact: heavy metal exposure

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified